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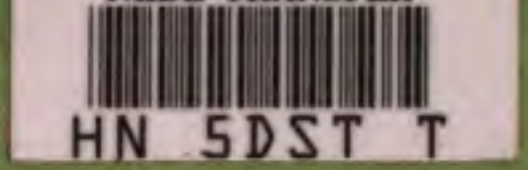

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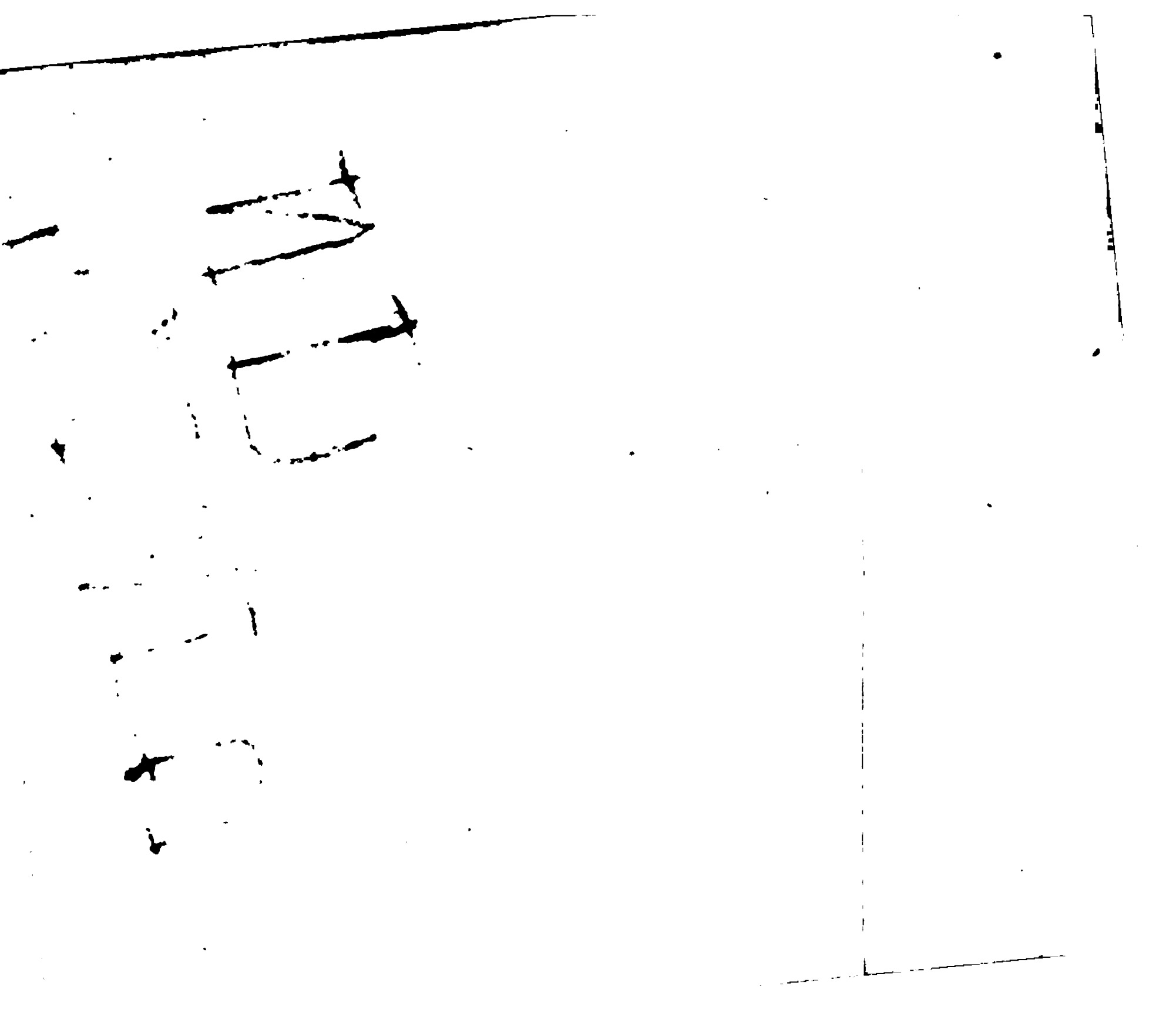

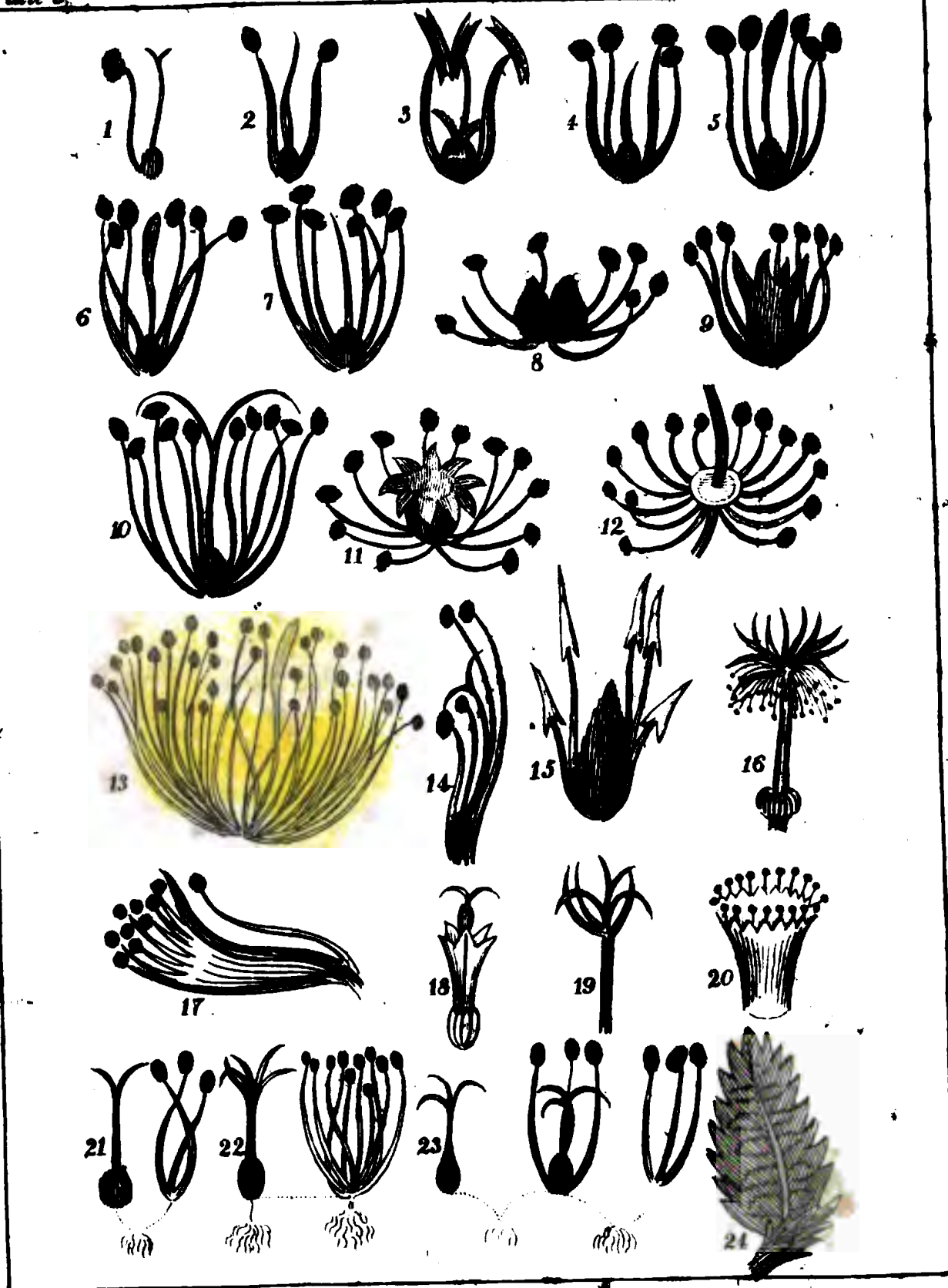
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THE

CHILD'S BOTANY.

FIFTH EDITION.

BOSTON:
CARTER AND HENDEE.
1832.

Jun 1832.10

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JNO. W. DAVIS, { *Clerk of the District of Massachusetts.*

STEREOTYPED AT THE
LANCASTER STEREOTYPE FOUNDRY.

Samuel Griswold Goodrich

PREFACE.

THE writer of the following pages was induced to make an attempt at simplifying the first principles of Botany, for the use of children, from the belief that their minds are capable of understanding, and being interested in, many of those subjects which have generally been treated of in a manner solely adapted to minds of maturer age.

Some of the first books which are put into the hands of children, are those that relate to the Natural History of Animals. But there are facts relating to the Natural History of Vegetables, that may certainly be rendered as useful and interesting to them.

That children should of themselves enter, with

great interest, into the subject of this book, can hardly be expected; but if parents would direct their attention, by asking questions, and by requiring them to apply what they read to what they see, they will engage with ardour in the study; and the effect will be of incalculable benefit to their expanding minds.

CHILD'S BOTANY.

CHAPTER I.

EVERY little child knows that there are a great many plants on the earth. By plants I mean all kinds of trees, bushes, briers, vines, grasses, grains, weeds, and mosses; or everything that produces flowers and fruit, as all plants do. But very few children, and not many grown people, think much about the beautiful flowers that cover every meadow in the summer, or know why they were made.

Little children! I intend to tell you a great

What are plants?

deal about them, in this book which I am writing, on purpose to instruct and amuse you. Perhaps you will think it is not so pleasant to read about trees and flowers, as to read stories or to go to play. But if you wish to live useful lives, and be respected and happy, you must read and study for instruction, as well as amusement.

Well, how many different kinds of plants do you think there are in the world? More than thirty thousand have been discovered! These vary in size, from the smallest mosses to the largest trees. For the mosses that grow on the rocks and fences have flowers, as well as the larger plants; but they are so small, that you cannot see them with your naked eye. It is necessary to look at them through a micro-

Do all plants produce flowers and fruit?
How many different kinds of plants have been found?
How do these vary in size?
Can you see the flowers of all with your naked eye?

scope, or a large magnifying glass, and then you can see them very distinctly. Thirty thousand is a great many, but there are probably many more, that have never been found, or that are too small to be observed.

Can you tell how many flowers there are of any one of these thirty thousand kinds? Take a dandelion, for instance. Can you tell how many dandelions you ever saw? You have seen large fields yellow with them in the spring. They are very pretty flowers, too; much prettier than many you will find in a lady's flower-garden. But the lady does not want them in her garden, because they are so common; every body can find dandelions enough: they grow in nearly all parts of the world. How many millions of them there must be! nobody can count

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Are there any more plants in the world which have not been discovered? Does each one of these kinds contain few, or many flowers?

them all. Now, if every one of these thirty thousand kinds consists of as many single flowers as the dandelion does, what a vast multitude of flowers there are! We cannot, indeed, conceive the number.

Do you ever think how, or in what manner, plants live and grow? We all know that God makes them grow; but the manner of their growing is very curious. Their life and growth are, in some respects, similar to those of animals. The circulation of the blood in the veins supports the life of an animal. The blood is formed from what it eats, and it is continually carried from the heart to all parts of the body; and when it is stopped at the heart, the animal immediately dies. In the same way the sap of a

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The dandelion is one kind—is the number of dandelions small?
Can you form an idea of the number of single flowers on the earth?
Is the manner in which plants live and grow, at all similar to the life and growth of animals?
What supports the life of an animal?

tree is drawn from the earth to the roots; and through small passages, like the veins in your hand, it is conveyed up the body of the tree to all the branches, leaves, flowers, and fruit. If you should cut off all the little fibres of the roots, through which the sap is drawn into the tree, the tree would die. The tree lives and grows, but it cannot feel or move, like an animal.

We must next consider of what use plants are. They are necessary to support life. Without them we should have no food. Our bread is made of grain; we eat a great many vegetables, which grow in the garden; and trees produce our fruit. Do you think that if we had no vegetables, we could live on meat? But

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What supports the life of a plant?
From whence does the plant draw its sap?
How is the sap conveyed from the root of the tree to its branches and leaves?
Have plants any feeling?
Are plants useful?
Could we live without them?

where should we get our meat? Cattle, sheep, and hogs, live on grass, corn, and potatoes. They cannot eat dirt and stones, any better than you can. All animals live on the plants which grow on the earth.

If there were no trees, we could not have such comfortable houses as we have now. All our boards are made from trees. How many useful things we have which are made of wood! We should freeze in the winter if we had no fires; and many parts of the country are dependent upon wood to make them.

Our shirts and other clothes are linen and cotton; and you know these are plants. Cotton grows at the South, and linen is made of flax. Ropes are very useful: a ship could not

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Are all animals dependent on them for food?
Have we any things made from trees which conduce to our comfort?
What are some of them?
Could we live without wood?
Of what are some of our clothes made?

be managed without them. They are made of hemp or flax.

Besides the food, wood, and clothes, with which we are furnished, many plants are valuable for medicine. A great part of the medicine in an apothecary's shop is made from them; and it is probable that there are many more, which would be useful in sickness, if we were acquainted with them.

Did you ever hear how much the Indians know about roots? They have no other medicine. They cure many diseases, and wounds, and even the bite of the rattlesnake, with them.

Many white persons, too, who are accustomed to work in the woods, and examine plants, learn what many of them are good for; and they

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Of what are ropes made?
Are plants used for medicine?
Is much medicine obtained from them?
Have the Indians much knowledge of roots?
Are they skilful in curing diseases and wounds with them?

gather them for those who are sick. They are called herbs, and are used for colds, coughs, and consumptions. I dare say you have often drank *herb tea* when you had a bad cold.

Plants are not only useful and necessary for our support, but they are scattered over the earth in such variety and abundance, as to make it very pleasant and delightful for us. We do not like to look at those things which are unpleasant. We should soon be tired of gazing at large plains of sand, where there were no green grass, and trees, and beautiful flowers. God has given us these things, because they are very pleasant to our eyes. How badly we should feel if, in a hot summer day, we had nothing to shelter us from the sun! It is very delightful to sit in the cool

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For what are herbs used?

Do trees and flowers make the surface of the earth beautiful and pleasant?

Is the appearance of green leaves and flowers more agreeable to the eye than plains of sand?

shade when we are hot and tired. The cows, too, and other animals, lie down under the trees when the sun is hot. The birds sing and chirp among the branches. They build their nests in the trees, and are happy because they have such pleasant places in which to live. Trees, vegetables, and fruits, were made for animals, as well as for mankind. And we should not deprive them of what God has given them.

Do you know what great forests there are in America? They were much greater formerly than they are now. Two or three hundred years ago, all the country about New-York, and Boston, and Hartford, was covered with woods. In these the Indians lived; and they were full of

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Do trees render men, and beasts, and birds, more comfortable, by protecting them from the hot rays of the sun?

Were vegetables made for men alone?

Were there formerly greater forests in this country than there are now?

Was the country about New-York, Boston, and Hartford, always as clear of trees as it is now?

bears, wolves, panthers, deers, foxes, and many other animals. But when our forefathers came from England, they cut down the woods, to prepare the land for grain, grass, and fruit-trees. For the white people were civilized, and they wished to get their living by farming, and not by hunting, as the Indians did. But, far to the west, there are now forests, which are a great many miles in extent, and where the Indians and wild beasts now live.

Although we have not such large forests here, we have some woods which are very beautiful, and where the rabbits, squirrels, partridges, and other birds live. Are you not fond of walking in the woods? It is very pleasant; and in the

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Why did our forefathers cut down the forests?
Do the Indians and wild beasts prefer to live in forests, or in a clear country?
Have we any woods in New-England?
What animals live in them?
Do you find any flowers in the woods?

spring you will find many pretty flowers there, and in autumn an abundance of nuts.

In the spring and summer our meadows are rendered very beautiful by the great variety of flowers with which they are covered. Of how many different colours they are! Some are red, some yellow, some blue, some purple, and some white. Some are very sweet scented, and others are unpleasant. Some are large, and others are very small.

Do you not like to walk in the fields, and gather flowers? It is much better than to play idly, or to rob birds' nests, as some bad boys do. It is very cruel to take eggs or young birds from their nests, but it is proper to collect flow-

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What makes the meadows and fields appear so beautiful in the spring and summer?
Are all flowers of one colour?
What are some of the different colours?
Have all flowers an agreeable smell?
Is it pleasant to gather flowers?
Is it more proper than idle play or mischief?

ers; and while those boys who destroy nests are only learning to be bad, you, by learning about flowers and plants, will be preparing for usefulness. Perhaps your parents or friends can tell you the names of the flowers which you find; and if so, you must remember them. When you go into a lady's flower-garden, you must inquire the names of the different flowers which you see there, and in this way you will learn much. You should likewise ask the uses of them; for, as I told you before, many are good for sickness. Some will cure the tooth-ache, and some other diseases and pains. And if you know them, when your friends are sick you can get some for them.

Why?
Is it of any use to learn about flowers?

CHAPTER II.

THE knowledge of plants and their uses is called *Botany.* Those who are acquainted with Botany are called *Botanists.* I wish to have all the children who read this book become botanists. I do not expect you to be botanists as soon as you have read what I have to tell you, for I cannot tell you about but very few plants, in comparison with the vast number of them which are every where found; but there are books which describe a great many. You cannot understand these now; but when you are a few years older, you will be able to read them, and find the names of all the flowers which you gather. A botanist, when he finds a flower which he never saw before, examines it, and

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What is *Botany?*
What are those persons called who are acquainted with Botany?
When a Botanist finds a new plant, how does he find its name?

then turns to it in his books, where it is described, and finds its name, and what is its use. How this is done I shall tell you by and by.

When the Botanist has found the name of the plant, he presses it and dries it; and then puts it in his *herbarium*, with the name written close by it. I will tell you what an *herbarium* is, and how you can make one.

An *herbarium* is a large paper book filled with different kinds of flowers, with their names written close by them.

You can make an *herbarium* if you wish. You must get two planed boards, about as large as the half of a newspaper; and likewise a parcel of old newspapers. When you find a flower, pick it, with a small branch and some of the leaves hanging to it; or if the plant be very

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What is an *herbarium*?
How is an *herbarium* made?

small, take the whole of it. Put it in the fold of a newspaper, with the leaves and flowers carefully and smoothly spread, and lay it between your boards. Put a heavy stone on the boards to press it. When you find another, put it on the top of the one you already have between the boards, in the same way. You may put as many plants in different papers, between the same boards, as you please. But, as the plants are green, the papers will soon become damp. Therefore you must change them once in about two or three days, and put them in other papers, which you have dried by the sun or fire, or they will become mouldy. They will very soon be dry, then they will look more beautiful than the pictures of flowers. If you will be industrious, you can press two or three hundred flowers in one summer, for there are a great many in every

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Describe the method of drying flowers?

field. When they are thoroughly dried, you must ask your mother or sister to make you a book of old papers, and put all the flowers in it. Perhaps somebody will tell you their names, and then you, or your parents for you, can write them on small pieces of white paper, and fasten them by little slits to the plants; and then you will always remember them. If you are acquainted with a botanist, the best way will be to send your book to him, and he will write down all the names for you.

A great many people do not know the names of flowers and plants, because they do not pay any attention to them. But if they would spend the time which they waste, in learning about them, or noticing them as they grow in the fields, they would enjoy it very much. I wish to have

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Do all persons know about flowers and plants?
Why do they not?

you, children, love to gather flowers and learn their names. And I shall expect all of you who can, to make an herbarium as I told you. You must ask your parents if you may, and I am sure they will let you, and help you all they can. They will, if they wish you to improve, and to become good and wise. And it is much better employment than to be always at play, or doing something that will neither benefit yourselves nor anybody else. For play does not improve your minds. I do not mean to tell you, that you must not play at all, for it is very proper for children to play sometimes; but some children are always playing, and do not wish to do anything else. They never will be useful or learned men.

To study botany will improve and strengthen your minds; for you must learn the names of all

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Will it improve your minds to be always at play?

your flowers, and I shall expect you to learn all the hard names which you find in this book, such as *herbarium*, &c. I dare say a great many grown people do not know what *herbarium* means, and likewise many other botanical words, which I shall write in this book by and by. And if you learn them all, you will be wiser for it. If you wish for play, I think you will find it a very pretty play to ramble in the fields and woods in search of flowers, where it is cool and pleasant, and where you can hear the birds sing so sweetly.

For my part I love to leave the dusty town and streets (and I did when I was a little boy), and wander through fields and woods to the tops of the mountains and rocks, where there is a cool breeze, and see the beautiful prospect, and sit by the little brook as it tumbles and murmurs·

What effect will the study of Botany have on your mind?
Do all grown persons know the meaning of botanical words?

over the rocks and stones, and gather the wild flowers that grow on its banks, while the birds are singing in the trees, and the squirrels are chirping around me.

Some botanists have made large gardens in which they cultivate a great many flowers, some wild, and some from foreign countries. These are called Botanical gardens. In them are glass houses, and hot-beds, to raise those flowers which come from warm countries. There are a few of these gardens in America; but in Europe there are many, and some of them are very large, containing several thousand different plants. It costs a great deal of money to support them.

Perhaps you have seen a green-house. A green-house has a roof and sides of glass to ad-

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What is a botanical garden?
Are there any botanical gardens in America?
Are there any in Europe?
What is a green-house?

mit the rays of the sun. In this many beautiful plants are kept in flower during the winter, when they would die, if exposed to the snow and frosts.

Although you cannot own a botanical garden, or a green-house, yet, if your father will let you have a little land, you can make a little flower garden for yourself. Anybody will give you flower seeds; and you can transplant some wild flowers from the fields, for many of them are very pretty and curious. In this way you will have a beautiful garden. But you must take good care of it, and not let it run to weeds.

There have been some great botanists in the world. Linnæus was the most distinguished. He was born in Upsal, in Sweden. He had a great love of plants, and he made many disco-

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Who was the distinguished Botanist?
Where was he born?
Was he fond of searching for flowers?

veries. He used to travel about the mountains and woods in search of new flowers, and although it was cold and stormy, he did not mind it. He invented a method of classing and describing different plants, which is very beautiful, and it is almost universally used by botanists at the present time. It is called the Linnæan system. I shall tell you about it by and by.

There are some eminent botanists in this country; and some of them have written books about the flowers which grow in America. One of the best of these, is that written by Dr. Bigelow, of Boston, describing the wild flowers of New-England. Two works, one by Nuttal and one by Eaton, are very good. Dr. Torrey, of New-York, is publishing a very large Botany of New-England and the Middle States, which

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What is the name of that system of classing and describing plants which he invented?

Are there any eminent botanists in this country?

will be very valuable. When you are old enough, you should study one of these books.

Some botanists are so fond of the study, that they are willing to wander about the woods for several weeks, and sleep in a tent, in order to find one new flower.

Some folks think that it is very foolish to devote so much time to flowers. But they are ignorant of the pleasure derived from the study, and also of the use of it. They do not know that much of the medicine which they give a great price for, when they are sick, is made of the plants which grow around their houses. But such is the fact. The physicians and apothecaries of this country have long imported from Europe medicines, which are made of plants

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Do any persons think it foolish to devote much time to flowers?
Would they think so, if they knew the use of it?
Do not many of the plants which are brought from Europe for medicine grow in this country?

that are very common here. This is a great waste of time and money. But although plants are useful, they will not do us any good if we are ignorant of them. Neither should we know those which are poisonous from those which are not. It is therefore necessary to have botanists to examine plants, and discover their uses. Much more is known about plants in Europe than in America, because it is an older country. Therefore I wish to have the children here begin to learn about it, for the Americans ought not to be excelled by Europeans, since we have many more plants than they have.

Although plants are useful in medicine, would they do us any good if we were unacquainted with them?

Why is more known about plants in Europe than in America?

CHAPTER III.

ALL plants are divided into six kinds, or *habitats*, from the situation or places in which they grow. The *habitat* of a plant is the place where it most naturally grows. The six kinds are these: *Alpine, hilly, shady, champaign, aquatic,* and *parasitic.*

Alpine plants are those that grow on very high mountains.

Hilly plants are those that grow on hills, where they have a dry soil, and are exposed to the heat of the sun.

Shady plants flourish in woods and shady places. They cannot bear the hot rays of the

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Into how many kinds or habitats are all plants divided?
What is the habitat of a plant?
What are the names of the six habitats?
What are *Alpine* plants?
What are *Hilly* plants?
What are *Shady* plants?

sun, but wilt down and die, when the trees are cut away. The yellow and purple lady's slippers are shady plants; and they are two of the most beautiful flowers in America.

Champaign plants grow in low and dry plains.

Aquatic plants live in marshes, wet places, by the sea shore, and in water; as flags, pickerel weed, sea weeds, and several different kinds of lilies.

Parasitic plants, instead of taking root in the earth, grow from the bodies and branches of trees, and from the stems of other plants. You have often seen moss growing on trees. It is a parasitic plant; so is the mistletoe, and dodder, and some others. Dodder is a very singular plant, and it is very common in New-England. It is a

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What are *Champaign* plants?
What are *Aquatic* plants?
What are *Parasitic* plants?
Can you name some plants which are parasitic?
Can you describe the dodder?

bright yellow vine, about the size of a large thread, without any leaves, twining itself about the branches and leaves of other plants, and penetrating them with its fibrous roots, to be nourished by their juices. It grows in damp places, and has small white flowers in bunches. It flowers in July or August. By some people in New-England it is called "gold-thread vine." You must try to find it in the summer.

These six kinds of plants, which I have told you about, will not grow in any other places than those in which they are found, unless they are similar places. If you should transplant a champaign plant to a wet or shady place, it would not flourish. Or, if you should set out a pond lily or a blue flag in your dry garden, they would soon wither and die.

Will these six kinds of plants grow in any other places than those in which they are found?

Would a pond lily or blue flag grow in dry ground?

Light has some curious effects on plants. The leaves of trees are always turned outward from the trees, toward the light. Did you ever notice a rosebush, or other plant in a lady's flowerpot, standing near the window? If you have, you would see every leaf on the bush facing the window. So all the plants in a green-house present the surfaces of their leaves towards the sides that is made of glass. The heads of wheat and rye hang towards the sun: the next time you see a field of grain you must observe this. If you will walk in a flower-garden, when the sun rises, you will see the leaves and flowers of some plants facing the east. If you look at them again at noon, you will see their surfaces turned upwards; and at sunset you will find

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Has light any effect on plants?
Which way are the leaves of a tree always turned?
Towards what are the surfaces of the leaves of plants in a green-house presented?
Which way do wheat and rye heads hang?

them facing the west. They follow the sun all day. The lupine is one of these. It is a very common garden flower. The next time you see one, you must see if it faces the sun. Those plants which grow in dark places, lose their green colour; as the tops of potatoes and turnips, and the sprouts of cabbages growing in a dark cellar, are white instead of green.

There is another division of plants, into *woody* and *herbaceous*.

Woody plants are those whose stalks and branches are composed of wood, as trees, bushes, shrubs, briers, &c. which are not destroyed by the winter.

Herbaceous plants are those whose stalks are

Do any flowers and leaves face the sun all day?
Can you mention the name of any plant that always faces the sun?
What is the colour of plants which grow in a dark cellar?
What are *Woody* plants?
Name some of them.
What are *Herbaceous* plants?

not composed of wood, but which generally perish every year, down to the roots; as potatoes, tulips, dandelions, all kinds of weeds, &c. &c.

Plants are also divided into three kinds, according to their ages. These are *annual, biennial* and *perennial.* You know that some plants live much longer than others.

Annual plants are those that live through only one year. They come from the seed in the spring, and in autumn die, both roots and branches. All those plants which it is necessary to raise from the seed every year, are called *annual,* as cucumbers, melons, peas, bachelor's buttons, &c.

Biennial plants live two years. They come up in one summer, produce their flowers, fruit,

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Name some of them.
How are plants divided according to their ages?
What are *Annual* plants?
Name some of them.
What are *Biennial* plants?

or seeds, and die in the next; as wheat, beets, parsneps, cabbages, fox-glove, &c. You have probably seen people sow beet seed in the spring, and in the fall put the beets in the cellar. The next spring you have seen some of the beet roots set out in the garden. The first summer they produce no flowers; but the second, they have flowers and seeds. Then the root dies and rots in the ground. It will live no longer.

Perennial plants live many years. They continue to blossom and bear seed or fruit year after year. The tops of some of them die every year, and the root only lives; as tulips and dandelions. Others do not die at all, except the leaves; as all kinds of trees, bushes, and briars.

You can tell how old a tree is, after it is cut down, by counting the number of rings it has

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Name some of them.
What are *Perennial* plants?
Name some of them.

on the inside. A new coat of wood comes on every year; and the tree is just as many years old as it has rings.

Besides those plants which are called annual, biennial, and perennial, there are some others, which spring up, produce flowers and seeds, and die in less than one day. These are called *ephemeral*, because they are so short lived.

Plants are also divided into *indigenous* and *exotic*.

Indigenous plants are those that naturally grow wild in any country, or part of a country, in distinction from those that have been brought from other countries; as crane's bill, buttercups, blue violets, and sorrel. These grow every where, in all the fields and roads. The seeds of these

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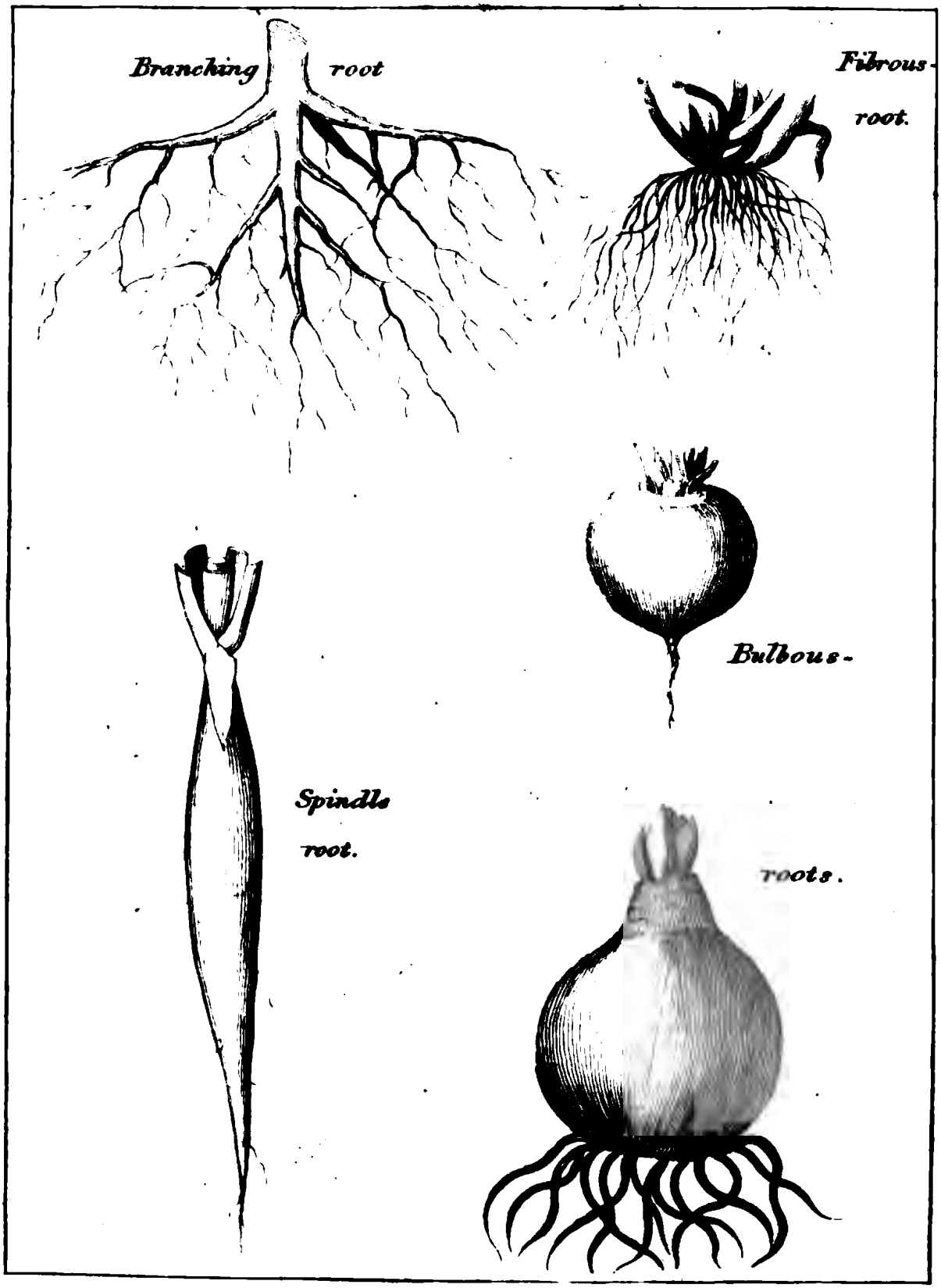
How can you tell the age of a tree?
What are *Ephemeral* plants?
Into what other two classes are plants divided?
What are *Indigenous* plants?
Name some of them.

were not brought from Europe, but they have always grown here.

Exotics are those which have been introduced, or brought from other countries; as tulips, pinks, sweet-williams, lilacs, and daffodils. You will not find these growing wild in the fields and woods, for they were brought from other countries, and are cultivated in gardens and yards for their beautiful flowers.

Most of our trees are *indigenous;* as all the trees you see in the forests. But our fruit trees are principally *exotic;* as the apple, pear, peach, cherry, plum, &c. These do not grow wild in the woods. Some of our shade trees, likewise, are exotics; as the horse-chestnut, poplar, &c.

What are *Exotic* plants?
What are the names of some of them?
Are our forest trees indigenous or exotic?
Are our fruit trees principally indigenous or exotic?



ROOTS. Page 39.

CHAPTER IV.

THERE are different names applied to the several parts of every plant, as the following:

The *root*, as you know, is the part beneath the ground, or that enters other substances for support; as the parasitic plants. The root has different names as it is different in shape.

A *branching* root is divided into several parts, in a similar manner to the upper part of the plant; as the roots of trees.

Fibrous roots are divided into very fine thread-like parts; as grass roots.

Spindle roots are large at the top, tapering downwards to a point; as beets and parsneps.

Bulbous roots are nearly round, and fleshy; as the turnip and onion.

What is the *root* of a plant?
Into what different kinds are roots divided?
What are *branching* roots? What are *fibrous* roots?
What are *spindle* roots? What are *bulbous* roots?

There are some roots of different shapes from these, and they have other names. But the four I have mentioned are the most common. You will distinguish them by looking at the pictures. You must notice the different shapes of roots.

The *trunk* of a plant is the part which rises from the root above the ground; as the body of a tree, and the stalk of a small plant. From the trunk proceed the branches; and these support the leaves, flowers, and fruit.

In the winter there are no leaves upon the tree, but there are many buds on the branches. The leaves and flowers are inclosed in these in a perfect state, although very small. Some buds produce only leaves; others produce the flowers. The leaf-buds are slender and sharp-pointed, but the flower-buds are thicker, and blunt. If

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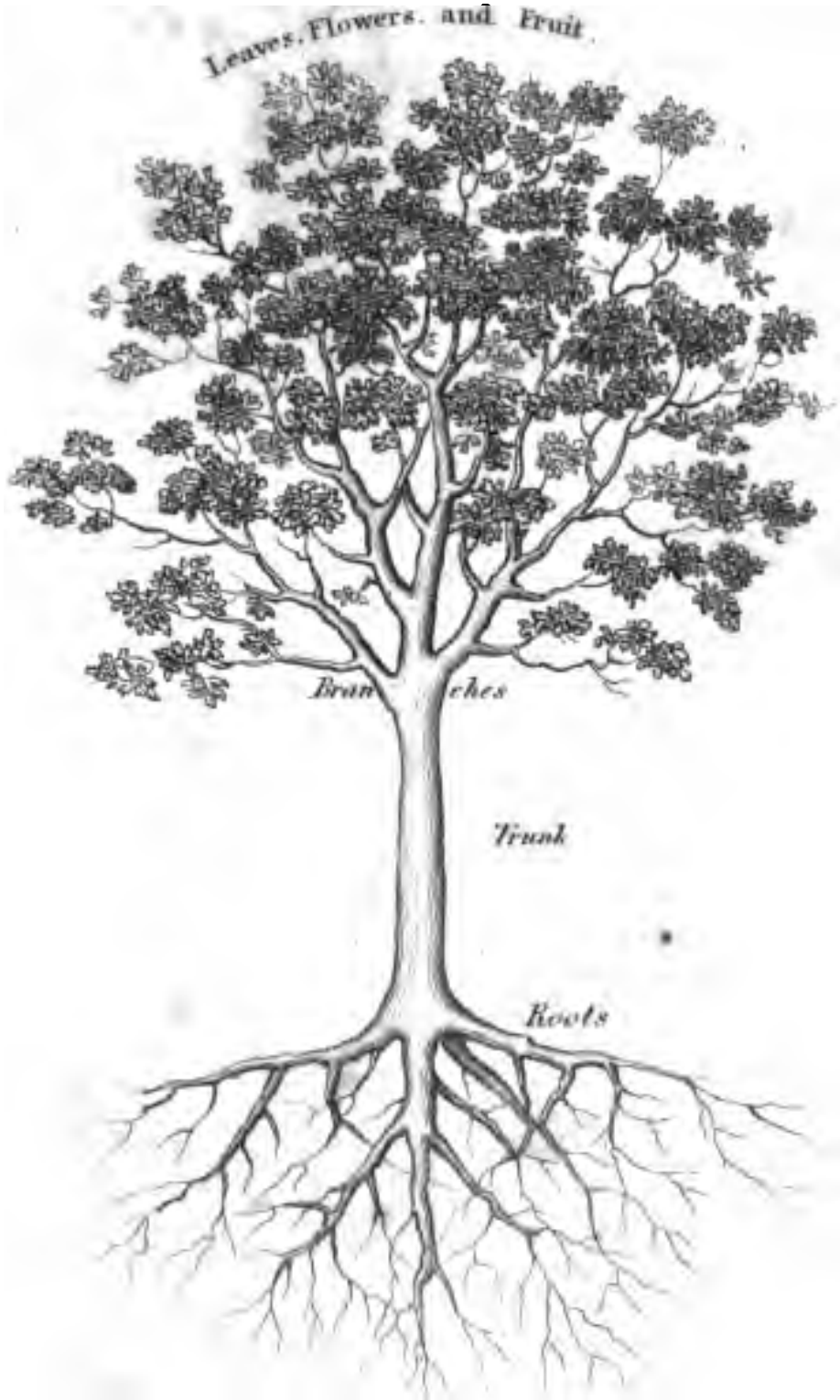
What is the *trunk* of a plant?
What do the buds inclose? What is the shape of the leaf-buds?
What is the shape of the flower-buds?



PICTURE OF A TREE. *Page 40.*

you pick a flower-bud to pieces carefully, and examine it with a magnifying glass, you can see all the parts of the flower. It is very wonderful how nicely the little leaves and flowers are packed up in the buds, so as to preserve them from the frost in the winter; and when the weather becomes warm in the spring, and the sap ascends from the roots, how curiously they open and unroll themselves, and grow. How beautiful the trees and flowers appear in spring! At first you see nothing but naked branches, and then in a few days they are covered with green leaves. Soon the flowers decay, and then the fruit begins to grow. It ripens in the summer and autumn, and then falls to the ground. The leaves of most trees fall off and decay, and the sap descends to the roots. But some trees retain their leaves during the winter. These are called *ever-*

greens. The white pine, hemlock, and laurel are evergreens. They are green all winter.

Leaves are very different in their forms and shapes. There is a name for every form. And before a botanist can find a flower, he must notice the shape of its leaves. I shall describe a few of these, and you will find them in the picture.* The leaf-stem is called the *petiole*, and the ridge in the middle of the leaf is called the *midrib.*

*EXPLANATION OF PLATE I.

1. A cordate and serrate leaf.
2. An ovate leaf.
3. A lanceolate leaf.
4. A linear leaf.
5. An arrow-form leaf.
6. A palmate leaf.
7. A pedate leaf.
8. A lobbed leaf.
9 and 10. Pinnate leaves.

When do the leaves of trees fall off? Where does the sap then go?
Do all trees shed their leaves in autumn?
What are those called which retain their leaves during the winter?
Name some of the evergreens.
Are there many different shapes of leaves? What is the leaf-stem called.
What is the ridge in the middle of the leaf called?

Plate 1

Ovate leaf. Shaped like an egg; as an apple leaf.

Obovate. The same as ovate, with the narrowest end towards the stem: as the daisy.

Oval. An oval leaf has both ends of the same breadth; as the wild cherry.

Cordate. A cordate leaf is heart-shaped, having the part towards the stem shaped like a heart: as the lilac.

Lanceolate. Shaped somewhat like an ancient lance, being long, narrow, and tapering to a point: as the willow.

Linear. It is of the same width through nearly the whole length, and pointed at the end: as some of the grasses.

What is an *ovate* leaf?
What is an *obovate* leaf?
What is an *oval* leaf?
What is a *cordate* leaf?
What is a *lanceolate* leaf?
What is a *linear* plant?

Awl-form. Narrow, and curved at the point, like a shoemaker's awl.

Arrow-form. Shaped like the head of an arrow.

Lobed. Having deep notches or partings in the sides or ends: as the oak and maple.

Palmate. This resembles the hand with the fingers spread: as the horse-chestnut.

Pedate. Like a bird's foot: as the pedate violet.

Serrate. Having little notches on the edges, like saw teeth: as cherry and rose leaves.

Pinnate. Having separate leaves (called leaflets) on opposite sides of the petiole: as the locust.

What is an *awl-form* plant?
What is an *arrow-form* leaf?
What is a *lobed* leaf?
What is a *palmate* leaf?
What is a *pedate* leaf?
What is a *serrate* leaf?
What is a *pinnate* leaf?

There are a great many more names for leaves of other shapes, but I cannot explain them to you now.

The surfaces of leaves are different. Some are smooth and others rough. A *hairy* leaf is covered with hairs. A *downy* leaf is covered with cotton-like down. A *silky* leaf is covered with soft close hairs, like silk.

Some savage nations have rules for planting and sowing, when the leaves or flowers of certain trees first put forth. Thus the Indians, in some parts of America, say that the best time for planting corn is when the leaves of the white oak are "as big as a squirrel's ears." And some people in New-England are accustomed to sow their buckwheat when the chestnut tree is in blossom.

Are the surfaces of leaves different?
What is a *hairy* leaf?
What is a *downy* leaf? What is a *silky* leaf?

Leaves are of very different sizes. Some, you know, are very small, and others larger.

But we have no such large leaves in this cold climate as are found in southern countries. Palm leaves, which grow in the East Indies, are many feet in circumference. It is said that a single leaf of the Talipot, a tree which grows in the Island of Ceylon, is large enough to cover fifteen or twenty persons. How very large they are! We never saw such leaves. But they are very useful there, for it is so excessively hot that the people need very thick-shaded trees to protect them from the rays of the burning sun. God is very good; and he adapts the plants, in all parts of the earth, to the wants of the inhabitants.

Are the leaves of trees in hot countries larger than those of cold countries?

What is the size of a palm leaf?

What is the size of the talipot leaf?

Where does this grow?

I shall now tell you about the most beautiful part of a plant: I mean the *flower*. The flower is divided into seven parts. These you must be particular to learn and remember, as they are very important:—

1. Calyx.
2. Corol.
3. Stamens.
4. Pistil.
5. Pericarp.
6. Seed.
7. Receptacle.

1. The *calyx*, or flower-cup, is the green part immediately beneath the flower, in which the flower is generally situated. But sometimes the calyx is separated from the flower, being farther down the stalk. It consists either of one leaf, or of several. Some flowers have no calyx; as the tulip. The long tube in which the flower of

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What are the names of the seven parts of a flower?
What is the *calyx* of a flower?
Does every flower have a calyx?
Name one that has no calyx.

the pink is placed, is the calyx. The calyx leaves usually cover the flower before it blows, as the green leaves that cover a rose-bud are the calyx.

2. The *corol* is the colored part within the calyx. The leaves of the corol are called *petals*. A tulip has six petals. A rose has many petals. Most flowers have a *nectary*. This is the part in which the honey is found. It is sometimes called the honey-cup. From the nectary the bees gather their honey.

3. The *stamens* are the slender, thread-like substances within the corol, generally placed in a circle around the pistil. A tulip has six stamens, and an apple-tree blossom has twelve.

What is the *corol*?
What are the leaves of the corol called?
How many petals has a tulip?
What is the *nectary*?
By what other name is it sometimes called?
What are the *stamens*?
How many stamens has a tulip? How many has an apple blossom?

The stamen is divided into *anther*, *pollen*, and *filament*.

The *anther* is the little knob on the end of the stamen.

The pollen is the fine dust within and upon the anther. You have probably seen bees, when returning to their hives in the summer, have their thighs laden with a yellow powder. This is the pollen of flowers, which they have gathered. They lay it up in their little cells. It is pollen which you find in honey, and then it is called *bee-bread*. The pollen of vegetables, thus gathered by the bees, is made into *beeswax*.

The *filament* is the part which supports the anther and pollen.

4. The *pistil* is that part which stands in the

What are the names of the three parts of the stamen?
What is the *anther*?
What is the *pollen*?
What useful article is made of pollen, after it is gathered by bees?
What is the *filament*?

centre of the flower, surrounded by the stamens: as the large green substance in the centre of a tulip. Some flowers have but one pistil, and others have several. The pistil is divided into three parts, viz: the stigma, germe, and style.

The *stigma* is the lower knob or bunch, that is seated on the end of the pistil.

The *germe* is the lower part of the pistil, which, when it is ripe, contains the seed.

The *style* is that part of the pistil which connects the stigma with the germe. The style of the lily is very long, but the tulip has no style. Many other flowers have no styles.*

* EXPLANATION OF PLATE II.

1. Flower of the white Lily.
2. *a*, Six stamens and pistil. *b*, Receptacle.
3. Pistil. *a*, The germe. *b*, The style. *c*, The stigma.
4. Stamen. *a*, The filament. *b*, The anther.

What is the *pistil*?
What are the names of the three parts of the pistil?
What is the *stigma*?
What is the *germe*?
What is the *style*?

Fig. 1.

THE WHITE LILY.

5. The *pericarp* is the bag that contains the seed, sometimes called the seed-bag. Whatever contains the seed of a plant, is called the pericarp; as the pods of peas and beans, the head of a poppy, the shell of a nut, an apple, a grape, or a cucumber.

6. The *seed* is the part which, when sown or planted, will produce the plant. The seed, in fact, contains the plant rolled up in a very minute form. How wonderful is the manner in which plants are produced by means of seed! If there were no seeds, all plants would soon disappear. But the seeds are scattered from year to year, and thus the earth is kept clothed with verdure. All annual plants grow from seed every year.

Different plants produce a different number of

What is the *pericarp?*
What is the *seed?*
Does the seed contain the *plant?*
How are plants produced from year to year?

seeds. Some have only one, and some two or more. Others have a great many. One stalk of Indian corn produced in one summer two thousand seeds, and one poppy produced thirty-two thousand seeds. A botanist once calculated the number of seeds which a single stalk of tobacco produced in one summer. He found the number to be three hundred and sixty thousand.

There are several curious ways in which seeds are scattered over the earth. Some are so formed as to be carried a great distance by the wind, as those that have an egrette. The *egrette* is the feathery or hairy down of seeds; as the down of thistles and dandelions, and many other seed. After the seed of these are ripe, they are

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Do all plants have the same number of seeds?

How many seeds did a single stalk of Indian corn produce in one summer?

How many seeds did one poppy produce?

How many seeds was it calculated were produced by one stalk of tobacco?

What is the *egrette*?

continually flying and rolling about the fields and meadows, as you have often seen; and in this way they are often carried many miles. It is on this account that you see such a number of dandelions everywhere.

Some seeds have wings, or are inclosed in winged pericarps, and thus, as it were, fly about when the wind blows, as the pericarps or seed-bags of the maple and elm trees. Perhaps you have noticed these, when they were falling from the trees, floating in the air.

Seeds, you know, will not often grow, unless they are covered with earth. Now squirrels, and some other animals, carry many acorns and nuts into holes in the ground. They often forget where they have laid these up, and so they are

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How are those seeds which have an egrette, scattered upon the face of the earth?

What is the use of wings that are attached to the seeds of maple and elm trees?

Do seeds grow, unless covered with earth?

How do squirrels plant trees?

left to grow. The Indians say that squirrels plant all the forest trees in the country.

It is said also that the blue jay, a beautiful bird, lays up many acorns and other seeds in the holes of fences, and among stones, and that these afterwards grow.

Many seeds are also conveyed a great distance in brooks and rivers, and even across the ocean. It is said that seeds have been conveyed from America to the islands near the coast of Scotland, by the ocean. This is known to be true, because the plants had never before grown on the islands, and they were found for the first time on the coasts towards America, where the same plants were known to grow in abundance.

7. The *receptacle* is the end of the flower-

Are seeds ever conveyed from one place to another by means of water?
Have seeds been conveyed across the ocean?
To what place are they supposed sometimes to have been carried across the ocean?
How is this known to be true?

stem, upon which the other six parts of the flower stand.

I have now described to you the seven parts of the flower. You must by all means get a large flower, and compare it with what I have told you. If you do not understand it, your parents will explain it to you. If you do thus, you will soon be able to tell the names of the different parts of every flower which you find, and likewise the names of the different shaped leaves. If you notice what plants die every year, and what ones live longer, you will be able to tell which are annual, which are biennial, and which are perennial. You must observe which plants are indigenous, and which are exotic, and likewise apply all the things which I tell you to the flowers you find in the gardens and fields.

It will be a very pretty play for you, when

What is a *receptacle?*

two or more children are together, to get some flowers, and ask each other which are the stamens, pistils, calyx, petals, &c. and see who can answer the most questions.

CHAPTER V.

If plants were described in a book without any regularity, it would be of no use. For when a person found a new plant, and wished to learn the name, he would not know in what part of his book to look for it. It would be necessary for him to look from one end to the other, before he could find it. This would be very troublesome, and to avoid it, plants have been divided into separate classes. There have been various

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If plants were described in a book without regularity, would it be of any use to a botanist?

How have plants been divided, in order to avoid irregularity?

ways of classing them. Some botanists have put all those plants which have similar flowers, into one class; thus dividing them into a great number of classes. Others have arranged them according to the use to which they are applied: to their taste, smell, or medicinal qualities. These divisions are called *Natural Orders*, because, in them, those plants which are naturally similar are brought together. Formerly, this was the only method of classing them; but Linnæus, the great Swedish botanist, as I told you before, invented a different method, called the Linnæan System. This is the best method in use; and I will now tell you about it.

Linnæus has divided all plants into twenty-four classes. He found that every flower had

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In what way have some botanists arranged all plants in classes?
Have plants been classed according to their uses?
What are the divisions called?
Into how many classes did Linnæus divide plants?

stamens, and by means of these he classed them. Thus, all those plants which have one stamen belong to the first class; and those which have two stamens belong to the second class. As some flowers have stamens of different length, he classed these by themselves. The stamens of others are differently situated; and he divided these into separate classes. He found many plants whose stamens were so small that he could not see them. All these he put into one class. Thus twenty-four classes depend upon the stamens. You remember I told you what the stamens were. You must not forget it; for if you do, you will not understand about these classes. Here are the names of all the classes.

By means of what part of the flower did he thus class them?
Has every flower stamens?
Do the stamens differ in number, length, and situation, in different flowers?

I will explain them all; and you must be particular to learn them.

THE CLASSES OF LINNÆUS.

1. *Monandria.* One stamen.
2. *Diandria.* Two stamens.
3. *Triandria.* Three stamens.
4. *Tetandria.* Four stamens.
5. *Pentandria.* Five stamens.
6. *Hexandria.* Six stamens.
7. *Heptandria.* Seven stamens.

What is the name of the first class?
How many stamens has it?
What is the name of the second class?
How many stamens has it?
What is the name of the third class?
How many stamens has it?
What is the name of the fourth class?
How many stamens has it?
What is the name of the fifth class?
How many stamens has it?
What is the name of the sixth class?
How many stamens has it?
What is the name of the seventh class?
How many stamens has it?

8. *Octandria.* Eight stamens.

9. *Enneandria.* Nine stamens.

10. *Decandria.* Ten stamens.

11. *Dodecandria.* From twelve to nineteen stamens.

12. *Icosandria.* Twenty or more stamens standing on the calyx.

13. *Polyandria.* Twenty or more stamens standing on the receptacle.

14. *Didynamia.* Four stamens, two long and two short.

What is the name of the eighth class?
How many stamens has it?
What is the name of the ninth class?
How many stamens has it?
What is the name of the tenth class?
How many stamens has it?
What is the name of the eleventh class?
How many stamens has it?
What is the name of the twelfth class?
How many stamens has it, and on what part of the flower do they stand?
What is the name of the thirteenth class?
How many stamens has it, and on what part of the flower do they stand?
What is the name of the fourteenth class?
How many stamens has it; and how many of these are long, and how many are short?

15. *Tretadynamia.* Six stamens, four long and two short.

16. *Monadelphia.* Stamens united by their filaments into one parcel.

17. *Diadelphia.* Stamens united by their filaments into two parcels

18. *Polyadelphia.* Stamens united into more than two parcels.

19. *Syngenesia.* Five stamens, united by their anthers in one parcel. The flowers are compound; that is, having many small flowers united in one flower, as the dandelion.

What is the name of the fifteenth class?
How many stamens has it, and how many are long, and how many are short?
What is the name of the sixteenth class?
How, and into how many parcels, are the stamens united?
What is the name of the seventeenth class?
How, and into how many parcels, are the stamens united?
What is the name of the eighteenth class?
How, and into how many parcels, are the stamens united?
What is the name of the nineteenth class?
How many stamens has it, and how are they united?
Are the flowers simple or compound?

20. *Gynandria.* Standing on the pistil.

21. *Monœcia.* Stamens and pistils in separate flowers.

22. *Diœcia.* Stamens and pistils on separate plants; that is, the flowers on one plant have stamens and no pistils, and the flowers on the other plants have pistils and no stamens. Both these plants are the same as one.

23. *Polygamia.* Having some flowers with both stamens and pistils, some with only stamens, some with only pistils; and sometimes all these are found on the same plant, and sometimes on different plants.

What is the name of the twentieth class?

On what part of the flower do the stamens stand?

What is the name of the twenty-first class?

Do the stamens and pistils grow in the same or separate flowers, and on the same or separate plants?

What is the name of the twenty-second class?

Do the stamens and pistils grow on the same or different plants?

What is the name of the twenty-third class?

Are the stamens and pistils always separate, or sometimes separate and sometimes united?

Do they always grow on the same plant, or sometimes on the same and sometimes on different plants?

24. *Cryptogamia.* Stamens and pistils so minute that they cannot be discerned.

These are the classes of Linnæus. Some of them are so difficult, that you will not understand them at first. But I shall explain them further by and by, by describing several plants belonging to each of them. Some of them, however, are very simple, and you will understand them immediately. Thus, if you wish to know to which class the tulip belongs, you must get a tulip flower, and count the stamens. You will find six stamens. Therefore it belongs to the sixth class, which is called hexandria. The apple belongs to the twelfth class, or icosandria, because it has twenty or more stamens standing on the calyx. So whatever flower you find, you

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What is the name of the twenty-fourth class?
Can the stamens and pistils of this class be discerned?
To which class does the tulip belong?
Why?
To which class does the apple belong?
Why?

must count the stamens, or see on what part of it they stand, or if they are united together; and then by comparing it with the list of classes, you will find to which class it belongs.

As some of the classes contain a great number of plants, it was found necessary to divide them still farther. Therefore each class is divided into several parts, called *orders*. They are thus divided into orders, principally, from the number or situation of the pistils. Some of the classes, however, are subdivided for other reasons than the number of pistils.

ORDERS OF THE CLASSES.

Monogynia. One pistil.
Digynia. Two pistils.

How can you tell to which class any flower belongs?
Into what are the classes divided?
Upon what part of the flower do the orders principally depend?
What are the names of the orders?
How many pistils has Monogynia?
How many pistils has Digynia?

Trigynia. Three pistils.
Tetragynia. Four pistils.
Pentagynia. Five pistils.
Hexagynia. Six pistils.
Heptagynia. Seven pistils.
Decagynia. Ten pistils.
Polygynia. More than ten pistils.

There are several other orders, but it will be more difficult for you to understand them, and it is not necessary for you now, therefore I shall omit them. Those which I have described, are very easy. Thus, the orange lily belongs to the sixth class, and to the first order in that class, because it has six stamens and one pistil.

Thus plants are divided into *classes* and or-

How many pistils has Trigynia?
How many pistils has Tetragynia?
How many pistils has Pentagynia?
How many pistils has Hexagynia?
How many pistils has Heptagynia?
How many pistils has Decagynia?
How many pistils has Polygynia?

ders from their stamens and pistils. There is a division of the orders, called *genus*, or when there is more than one, *genera*. As many flowers under the same order differ in other respects, they are divided into genera. For example, two flowers may belong to the first order of the sixth class; one of them may have a calyx, and the other not; the flower of one of them may be differently shaped from the other; therefore they belong to different genera.

The genus is divided into *species*. The flower of two plants often agree, so as to belong to the same genus, while the leaves, stalks, and branches are very unlike. Therefore they belong to different genera.

Thus all plants are divided into *classes, orders,*

Into what are the orders divided?
Why are they divided into genera?
Into what is the genus divided?
Why is the genus divided into species?

genera, and *species*. When a botanist finds a flower, he examines the stamens, and finds to which class it belongs. Then he examines the pistils, and finds to which order under that class it belongs. Then he turns to the order, and compares it with the description of the different genera under that order, until he find its genus. Lastly, he compares it with the different species under that genus, until he finds the species with which it agrees; and there he finds the name of the flower.

Thus, if the flower is an orange or yellow lily; he counts the stamens. There are six. Therefore it belongs to the sixth class, or hexandria. He turns to that class in his book. He next counts the pistils. He finds but one. It belongs

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How does a botanist find to which class a flower belongs?
How does he find to which genus it belongs?
How does he find to which species it belongs?
To which class does the orange lily belong?
Why does it belong to this class?

to the first order of the class, or monogynia. He turns to the order. He sees that part of the plants under that order in the sixth class, have a calyx; and that part of them have none. He looks at the lily in his hand. It has no calyx. Therefore it belongs to that part of the order whose plants have no calyx. He compares it with the different genera in the order. It agrees with the lily, but with no other. *Lily* is the name of the genus. But there are several species belonging to this genus; that is, there are several different kinds of lilies. He reads the description of the first species. But it does not agree with it, for the first species is the white lily, and this is yellow. He compares it with the next species. It does not agree. That is a wild, red

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To which order does it belong?
Why does it belong to this order?
Has it a calyx?
To which genus does it belong?
Are there several species under this genus?

lily. He reads the next, and it agrees with it exactly. He finds the name written against it, orange lily.

I shall now describe some of the most interesting and curious plants under each class. Some of them will be such plants as you can find in the fields; but I shall tell you about some that grow in foreign countries. I cannot in this little book describe but very few common plants, but I will write a list of some of those which are most plentiful in New England, and by the help of this you can learn the names of many flowers. You will find this list at the end of the book. When you find any flower, the name of which is in that list, you can make a mark against it with a pencil, and thus see how many you can find in one summer, or how soon you can find them all.

What is the name of the species?

Your parents and friends will show you many flowers, the names of which I have written down.

CHAPTER VI.

CLASS I. MONANDRIA

Monogynia.

Ginger. This plant belongs to the first class, because it has but one stamen, and to the order Monogynia, because it has but one pistil. It grows wild in some parts of Asia, and is cultivated in the East and West Indies. Its flowers are beautiful and very fragrant. It is planted in trenches, and great quantities of it are raised. The root, you know, is used for spice. The roots are first dried, and then ground. Great quantities of it are carried away in ships, and

sold in Europe and America. You must remember where gingers grows.

CLASS II. DIANDRIA.

Monogynia.

Lilac. This is a very common and beautiful shrub. Its leaves are cordate. The flowers appear in May. They grow in large bunches, and are generally purple; but some are white. You will see lilacs before almost every house in New England. It is a great ornament to yards and gardens.

Catalpa. This is an elegant tree, not very common in New England; but it grows wild in the Southern States. Its leaves are cordate, or heart-shaped, very flat, and as large as a fan. They are larger than the leaves of any other tree we have. Its flowers are white, and striped with purple. They grow in large clusters, similar to the horse-chestnut. After the flowers are

gone, large pods grow out, like bean pods. These contain the seed.

Trigynia.

Black Pepper. It grows in the East Indies. It is a climbing plant, and runs upon bushes and trees. Its flowers are small and white. The berries grow in small clusters, like currants. They are red when ripe. When gathered, they are spread upon mats to dry in the sun. They soon become dry, black, and shrivelled, as you see them. Pepper, you know, is used a great deal in cooking food; and we put it upon many things which we eat. You must not forget that it grows in the East Indies.

CLASS III. TRIANDRIA.

Monogynia.

Flower-de-luce. This large and beautiful flower is cultivated in flower-gardens. Its leaves are sword-shaped, that is, long and flat, like the

shape of a sword. Flowers large, purple, and very showy.

Blue Flag. This is very common in meadows and wet places, in the early part of summer. Its leaves are sword-shaped. The flowers are similar to those of the flower-de-luce, but smaller. They are purple, striped with yellow. It is sometimes called *poison flag.* The root is a violent emetic. Therefore, you must not put it in your mouth.

Digynia.

Sugar Cane. This is much cultivated in the West Indies. It grows eight or nine feet high, having jointed stems, and long leaves of a greenish colour. It is from the sugar cane that sugar is made. The juice of the cane is very sweet. When the cane is cut down, it is stripped of the leaves, and cut into pieces about a yard long. These are carried to a mill, and bruised between

large wooden rollers, covered with iron. The juice is then boiled in large caldrons, or kettles, and the scum is taken off. It is again boiled until it begins to thicken, when it is put into large shallow wooden vessels. Here, as it cools, it turns to sugar. It does not all become sugar—what is left is called *molasses.* This sugar is called *brown sugar.* Much of it, however, is still farther purified, until it becomes white. It is then made into loaves, and called *loaf sugar.*

Great quantities of sugar are made in the West Indies, and exported to different countries. Many years ago sugar was used only as a medicine, but now it is used by everybody in various ways. A great many people are employed in making and selling sugar, and many millions of dollars are paid for it every year. Yet it is all made from a plant. How very useful and valuable the sugar cane is!

Wheat and *Rye.* You all know what these are. These two kinds of grain are very valuable to mankind. We are dependent upon them for bread. They are raised in great abundance by all civilized nations. They are biennial plants, being sown in one summer, and ripening the next. They are exotics, being brought from other countries.

Oats. They are an annual plant, everywhere cultivated for horses.

CLASS IV. TETANDRIA.

Teasel. This is an exotic. Its flowers grow in heads or bunches, which are somewhat egg-shaped, and covered with hooked prickles. It is cultivated on account of the burrs, and they are used to raise a nap on woollen cloth.

Dogwood Tree. This tree, sometimes called boxwood, grows in great abundance in all our forests and woods. It is a smallish tree, and is

covered with a rough, reddish bark. It appears very beautiful in the spring, when it is covered with large white flowers. The four large white leaves, which are generally taken for the corol, are the calyx leaves; the corols being very small, and in the centre of this calyx. If you examine the flowers you will find them in little bunches, and you will see that each of these large white calyx leaves has a twisted or curved notch at the end. The bark of the tree is sometimes used in medicine.

CLASS V. PETANDRIA.

Jersey Tea. A small shrub common in the woods. It has crowded bunches of small white flowers in June. Its leaves are serrate, and tapering to a point. It is called Jersey Tea, because in the revolutionary war its leaves were used as a substitute for tea.

Touch-me-not. This plant grows near brooks

and wet shady places. Its flowers are yellow, and shaped somewhat like little pitchers. It is called touch-me-not, because if you touch the pericarp, or seed-bag, when the seeds are ripe, it will immediately burst and scatter the seed. It is indigenous. But there is another touch-me-not, sometimes called snappers, which is an exotic. This is cultivated in flower-gardens, and has white or purple flowers.

Violet. There are many species of this beautiful flower. The garden violet has flowers which are partly yellow and partly purple. They are very handsome, and appear as soon as the snow is gone. This is an exotic.

Besides the garden violet, there are many wild violets in all our fields. We have them early in the spring. Of these, the most common are the yellow violet, two kinds of white violets, and several different blue violets. You will know

these as soon as you see them, for their flowers are of the same shape as the garden violet. But they have different colours and different leaves.

Coffee. This is an evergreen shrub, and is cultivated principally in Arabia, and in the East and West Indies. It grows from fifteen to twenty feet high. It produces berries, each of which contains two seeds of coffee, such as we see when it is brought to this country. Formerly, coffee was not used; but you know that it is very much used now, and highly valued.

Tobacco. Tobacco is raised principally in the southern states. Its leaves are large. When they are gathered they are suffered to wilt and dry, and are then rolled or twisted into various forms for chewing, or made into cigars for smoking. It is also ground into snuff. A great deal of tobacco is used now, but before America was discovered, it was unknown in Europe. The

Plate 4

Tea Plants

The Coffee Plant

Coffee Berries

Pages 80 and 92.

American Indians, however, had for a long time been accustomed to use it. The Indians are very fond of smoking.

The custom of smoking was first introduced into England from America by Sir Walter Raleigh. So strange a custom it appeared to them to be, that a man who happened to see Sir Walter smoking, threw a pitcher of water in his face, thinking he was on fire.

Digynia.

Poison Hemlock. This plant, sometimes called water hemlock, grows in wet meadows. It is a tall weed, with a hollow, purple, and striped stem. Its flowers are small and white, growing in umbels, that is, like the flowers of fennel. It very much resembles sweet-cicely. It is very poisonous, many persons having been killed by eating the root through mistake for sweet-cicely.

CLASS VI. HEXANDRIA.

Monogynia.

Barberry. This shrub is very common by fences and roadsides. Its branches have very sharp thorns. It has yellow flowers in clusters, appearing in June. Its berries are very acid, and are much used for preserves.

The stamens of the barberry flower, when in blossom, are spread out in the corol. If you touch them with a pin or a horse hair, they will suddenly spring up against the pistil.

Stargrass. This is a kind of grass, and it has small yellow flowers like stars, and appearing among the grass in pastures in June.

Dog-tooth Violet. It has only two leaves, similar to those of a tulip, and one flower on a long stem. The flower has six yellow petals, and somewhat resembles the lily. The flowers appear in May.

Fan Palm. This is a very curious tree, growing in the East Indies. Its trunk is straight, smooth, and as tall as the mast of a ship. It has but about eight or ten leaves. These are generally about six yards in length, and four yards wide. When dry, they fold up like a fan. They are used for the covering of huts, and the soldiers make tents of them.

The *tulip* and several kinds of *lilies*, belong to this class and order.

CLASS VII. HEPTANDRIA.

Monogynia.

Horse-Chestnut. This is a very beautiful tree. It is an exotic, but is cultivated in this country for shades. It has large clusters of beautiful white flowers. It bears large nuts, somewhat resembling chestnuts, but they are very bitter, and not good to eat.

CLASS VIII. OCTANDRIA.

Monogynia.

Whortleberry. This is a well known low bush, with oval leaves, producing very fine small black berries.

Bilberry. This resembles the whortleberry, except that the bark of the bush is green, and the berries are blue, with a somewhat acid taste.

Children are very fond of whortleberries and bilberries, and there is a great plenty of them in the woods and pastures in the summer. They often go and gather them.

CLASS IX. ENNEANDRIA.

Monogynia.

Sassafras. It sometimes grows to the size of a tree, but generally it is a shrub. It is found in woods. The bark of the twigs is smooth and

green. The whole tree has a smart spicy taste and smell, particularly the root. Boys are very fond of it, and often dig up the roots and eat the bark.

Cinnamon. The cinnamon which you buy at the shops is the bark of a tree which grows in the East Indies. The tree is about thirty feet high. Twice a year the natives of the East Indies go into the woods, and cut off all the small branches and twigs of the cinnamon tree. The bark of these they rip up with a knife, and take it off. It is then cut into pieces, and dried in the sun. When sufficiently dried it is sold to European merchants, who carry it away in vessels.

CLASS X. DECANDRIA.

Monogynia.

Laurel. A beautiful evergreen shrub. You will know it by seeing it covered with green leaves in the winter. It grows in the woods. In

June it has beautiful bunches of white or somewhat reddish flowers. It has ten stamens, and each of these lies in a little notch in the corol. The flowers are very sticky.

Indian Pipe. This is a very curious plant. It grows in the woods, and is about a foot high. The whole is perfectly white, and has nodding flowers resembling the bowl of a pipe.

Logwood. This grows in the West Indies. It is generally about twenty feet high, and is very crooked. It has many flowers which are very small. The wood is of a reddish colour, and so heavy that it will sink in water. Much of it is brought to this country, and used by clothiers and hatters for colouring.

Decagynia.

Poke Weed. This is very common by the sides of roads and fences. It is often called *co-*

cum. It grows six or eight feet high, and is very branching. It has long clusters of whitish flowers, and after them an abundance of small purple berries. The berries are flattish. The stalks and leaves are annual, but the root is perennial. It is sometimes used as a medicine.

CLASS XI. DODECANDRIA

Monogynia.

Snake-Root or *Wild Ginger.* A low plant with only two leaves, which are shaped somewhat like a horse's hoof. It has but one flower, which is rough and hairy, and grows from between the leaves near the ground. The root has a sharp biting taste.

Gamboge. It is found in the East Indies. It is a tree, and the *gamboge* which is used in painting yellow, is a gum obtained from the tree. To obtain it they cut little holes in the bark, and the

juice of the tree issues from them, and by the heat of the sun is changed to gum.

CLASS XII. ICOSANDRIA.

* *Pentagynia.*

Apple. It is unnecessary to describe the apple-tree to you, for you see them every day. But when they are in blossom, it will be well for you to compare the blossom with the description which I before gave of this class.

Much pains is taken to cultivate apples, for they are an excellent fruit, and are valuable for making cider. A great deal of cider is made in this country, and it is a very pleasant drink. It would be much better, however, if there was not so much; as what is not wanted to drink is distilled into brandy, of which some people drink too freely.

There are many different kinds of apples:

some are sour, and some are sweet; some good, and some very poor. There is a very curious way, you know, of making a tree which has before produced poor fruit, produce that which is good. It is by inserting the sprout of one tree into another, and is called *grafting*.

Rose. There are two kinds of roses common here, which are indigenous. These are the *sweet-brier* and the *swamp rose.* But besides these we have many exotics; such as the *white rose, damask rose, cinnamon rose, burgunda rose, monthly rose, moss rose, Scotch rose,* and many others. They are all beautiful, and very common in all our gardens and yards. Different roses can be inoculated into the same bush. I have seen three of the above kinds of roses growing on one bush.

To this class also belong the different kinds of pears, peaches, cherries, plums, and blackberries.

But these are so common that you know all about them.

CLASS XIII. POLYANDRIA.

Monogynia.

Side-saddle flower. This is a very singular flower. It grows in swamps. The leaves all grow from the root. They are a kind of hollow tube, open at the top, and surrounded with a brim, like a cup. These leaves will hold each about a wine glass of water, and they are generally full. It is thought that the plant is nourished by the water contained in the leaves. Its flower is dark purple, and grows on a long stem. It blossoms in June.

Blood Root. This has pretty white flowers, which appear in April. The root is of a reddish colour, and when broken emits a reddish juice. The root is much used, and is a very valuable

medicine. The tincture of blood root, which is sold by the apothecaries, is made of this. It is very common in all our woods.

Yellow Water-Lily. This you see in almost every stagnant pond. Its large roundish leaves are spread flat upon the water, and in June it has round yellow flowers, just raising themselves above the water.

Sweet-scented Water-Lily. This also grows in water, and has round floating leaves, like the yellow water-lily. But its flowers are very large and white. They are remarkably sweet-scented, more so than any other plant we have. It grows in deep water, and the stems of both leaves and flowers are very long.

Tea. It is cultivated in China. The tea which we use is made of the leaves of an evergreen shrub. It grows about five or six feet high, and the leaves are generally about an inch

and a half long. The Chinese, to prepare the tea for sale, roll up every leaf in their hands, and then dry it. It is afterwards packed in chests for sale to Europeans or Americans. How much work it must be to roll so many tea leaves as they do!

Pologynia.

Cowslip. It is very abundant by the side of brooks and in wet places. In the spring it has very bright yellow blossoms. It is often eaten for greens.

Anemone. There are three different species of this plant which blossom in April. They are very low, growing among the leaves and grass in woods, and by the sides of fences, with very pretty white flowers. You will find them very abundant in the latter part of April.

Crowfoot. There are many species of crow-

foot. You will see some of them in pastures and at the road sides at all times in the summer. They are frequently called butter-cups. They are branching weeds, with very bright yellow flowers.

Tulip tree. This is sometimes called white-wood. It is a beautiful tree. Its leaves are lobed, appearing as if they were cut square off at the end. It has large and very handsome flowers of a yellowish green colour. It grows in the woods, and is also cultivated for its beauty.

CLASS XIV. DIDYNAMIA.

Spearmint. It grows in wet places, and has small purple flowers. It has an aromatic or spicy taste, and is very common. Children are very fond of eating it.

Foxglove. It is an exotic; but is cultivated for its flowers. They are purple, long, and bell-shaped, and grow at the top of the stem, all

hanging upon one side. It is biennial. It is poisonous, but is used in medicine.

CLASS XV. TETRADYNAMIA.

Wild Pepper-Grass. It grows in abundance by the road sides, and has very small white flowers. It is thus named, because its taste is similar to the pepper-grass of the gardens, being very sharp and biting.

Horse-Radish. This grows in damp places. You know it by its smart, biting taste. The root of it is much used in the spring, and is eaten with different kinds of food.

Turnips and cabbage belong to this class, but you know all about them.

CLASS XVI. MONADELPHIA.

Blue-Eyed Grass. It is similar to grass, and you will find it growing among the grass in meadows. It has small delicate flowers in June and July.

Cotton. An annual plant much cultivated in the southern states. It is sown in rows, and the cotton grows in pods. After it is gathered, it is packed in large sacks and sent to market. Great quantities of cotton cloth are manufactured in this country. We have many cotton factories, which employ a great many workmen, and the cloth is sold very cheap.

Geranium. There are many species of this plant, which are cultivated in pots and green-houses. The leaves of most of them are very fragrant. Some of them are pleasant, and some unpleasant. There is a wild species very common in New England, called *crane's bill.* It grows by the fences and in the edges of woods, and is much more beautiful than many of those which are cultivated; but it is neglected because it is so common. I never saw it in a flower garden.

CLASS XVII. DIADELPHIA.

Locust Tree. A tall tree, much cultivated in New England. Its leaves are pinnate. It has long clusters of white flowers, which are very sweet scented.

Lupine. There are two species of this. One of them is exotic, and the other indigenous. The wild one is very common in sandy places, and is sometimes called the Indian Bean. It has long bunches of blue flowers. The exotic is common in flower-gardens. It is very much like the other. Its leaves face the sun all day.

Indigo. It is raised in the West Indies. It is sown in March, and reaped in August. The plants are then covered with water in large cisterns, and left to ferment until the water becomes very blue. It is then drawn off, and the colouring matter separated. It is then packed up for sale. Indigo is used to colour blue.

CLASS XVIII. POLYADELPHIA.

Orange. It is cultivated in the West Indies and southern states. Its fine yellow fruit you are well acquainted with. Oranges are raised in great abundance in warm countries, and sold in all parts of the world. You sometimes see little orange trees in flower-pots in New England, and properly taken care of they will produce oranges; but they are not fit to eat, for those that grow in cold climates are very bitter.

Lemon. The lemon tree is similar to the orange tree. The fruit is not so round as an orange, but is egg-shaped; and it is also very sour, while the orange is sweet.

CLASS XIX. SYNGENESIA.

Thorough-Wort. This is a rough, hairy plant, growing in meadows and low lands. The leaves are perfoliate; that is, appearing as if the stalk

grew through them. It has small bunches of white flowers. It is frequently called *boneset*, and is highly valued as an herb. The plant is very bitter.

Daisy. About the middle of summer, many meadows and pastures are rendered white by the blossoms of this plant. It grows from one to two feet high, and has large flowers on the top, yellow in the middle, and surrounded by a white border. Though it is very common, it is probably an exotic, the seed having been introduced from Europe. It is very troublesome to farmers.

Thistle. Very common by the road sides, and known by the sharp prickles with which it is covered. It has round and very prickly purple flowers. The seed is covered with a beautiful down, or egrette, and when it is ripe is continually driven about by the wind.

The *dandelion, sun-flower, marigold, life-everlasting*, and many others, belong to this class.

CLASS XX. GYNANDRIA.

Lady's Slipper. There are two species of this flower common in our woods. One of them is purple and the other yellow. The flower, consisting of four petals and a large hollow ball or nectary, looks somewhat like a spider. The purple species has only two leaves, growing from the root. The yellow species has a leafy stem. The leaves of both are oval.

Snake Mouth or *Arethusa.* The flower of this beautiful plant somewhat resembles the head and mouth of a snake. It grows in moist land. The flower is on the top of the stem, and bent over. The petals are purple.

CLASS XXI. MONŒCIA.

Cat-Tail or *Water Flag.* This plant grows in water. The leaves are long and sword-

shaped. It has a stem five or six feet long, with a round hard bunch on the top, which is the flower. The leaves are much used for bottoming chairs. Boys gather the stalks for arrows.

Indian Turnip. It is also called wild turnip, and is found in swamps and wet woods. The flower consists of one green leaf, which is bent over the top like a hood. After the flower is gone, it bears a bunch of small red berries. The root resembles a common turnip in shape; but when tasted of is hot and fiery as Cayenne pepper. It will produce a sore on the tongue.

Oak. There are several species of this tree; as white oak, black oak, swamp oak, red oak, and shrub oak. They form a great part of our woods. The white oak is the most valuable; it is the best wood we have for timber, and is much used for building houses, ships, &c. The oak bears acorns, you know; but they are very bitter, and

not good to eat. They are very good to fatten hogs.

Walnut. This is a beautiful tree. There are several kinds, some of which are good for timber. This tree produces nuts, some of which are very good to eat, and some are not. The shag-bark walnut, known by its rough, shaggy bark, produces the best nuts.

Button Wood. This tree grows to a very large size. You will know it by the balls which it bears, called *button balls.* These balls are the flowers. Every year, some of the outer bark scales off, leaving a smooth white surface. The end of the leaf stalk, or petiole, is hollowed out like the bowl of a pipe. The bud for the next year grows within this hollow.

The *chestnut, butternut, beech, witch-hazel, hornbeam,* and some other forest trees, belong to this class.

CLASS XXII. DIŒCIA.

Willow. There are many species of this. The *yellow willow* is known by the yellow bark of the twigs and branches; the *weeping willow* has very long, slender, and bending branches; the *basket willow* has long, red, and limber twigs, which are much used in making baskets.

Poplar. The poplar which you see about the streets and before houses, is called the *Lombardy poplar.* It is an exotic, and was brought from Italy. It is very tall, and the branches do not spread, but grow close to the tree.

There is another poplar that grows wild in the woods, and is called sometimes the *American poplar.* Its leaves are very tremulous. The wood is white.

Red Cedar. This is very common in roads and on mountains; the branches grow out from every part of the trunk, from the top to the bot-

tom; they extend themselves in all directions, the lower ones lying on the ground. The wood is red, and very durable. It is said that posts of this tree will last many years longer than any other wood.

CLASS XXIII. POLYGAMIA.

Sugar Maple. This tree is valued chiefly for its sap. The sap is collected in the spring, by boring holes in the tree, and fixing little elder troughs in them. It is then boiled down in large kettles until it becomes sugar: this is called *maple sugar.* Great quantities of it are made every year in the forests at the west.

Red Maple. This grows principally in swamps and low woods. It is called *red* from the colour of its flowers, which are deep crimson. They appear in April, before the tree leaves out, and hang in small bunches on the ends of the twigs.

CLASS XXIV. CRYPTOGAMIA.

This class contains all those plants whose flowers are so minute that they cannot be observed; there are a great many of them. All the *ferns, brakes, mushrooms, toad-stools, puff-balls, mosses, &c.* belong to this class. Also the *smut* which you see on ears of corn, and *mould;* for these are all plants. I shall not describe any of these, but you must remember when you see them that they have flowers, although you cannot perceive them; and likewise that they belong to the class Cryptogamia.

All those plants which belong to the first twenty-three classes are called *phenogamous;* because their pistils and stamens are sufficiently manifest for observation. All the plants belonging to this class are called *cryptogamus;* because their stamens and pistils *are not manifest.*

A CATALOGUE OF SOME OF THE MOST COMMON Exotic and Indigenous Plants IN NEW ENGLAND.

A
Agrimony
Alder
Amaranth
Anemone
Apple
Apricot
Arethusa
Arrow head
Aster
Avens

B
Bachelor's button
Balm of Gilead
Barberry
Basswood
Beech
Beet
Bell flower
Bilberry
Birch
Bittersweet
Blackberry
Bloodroot
Blue curls
Blue-eyed grass
Blue flag
Boneset
Bouncing Bett
Brake
Buckwheat
Bullrush
Burdock
Butter cups
Butterfly weed
Butternut
Button bush
Button ball

C
Cabbage
Candy tuft
Canterberry bells
Caraway
Cardinal flower
Carrot
Catalpa
Catnep
Cat tail
Cedar
Celadine
Celery
Cherry
Chestnut
Chess
Chickweed
Clover
Cockle
Cocum
Columbine
Corn
Cowslip
Coxcomb
Cranberry
Cranesbill
Cucumber
Currant bush

D
Daffodil
Daisy
Dandelion
Dewberry
Dill

Dock
Dodder
Dogwood
Dog-tooth violet
Dutchman's breeches

E

Elder
Elecampane
Elm
Eyebright

F

Fennel
Fern
Feverbush
Feverfew
Five fingers
Flag
Flax
Flower-de-luce
Flower of an hour
Four o'clock
Foxglove
Fringe gentian

G

Garlic geranium
Gill
Golden rod
Grape
Green brier
Ground nut

H

Hazle nut
Hemlock
Hemp
Hollyhock
Honeysuckle
Hop
Horehound

I

Indian pipe
Indian tobacco
Indigo weed
Itch weed
Ivy

J

Jacob's ladder
Jersey tea
Job's tears
Juniper bush

K

Knot grass

L

Lady's slipper
Larkspur
Laurel
Leather wood
Lichnidia
Life everlasting
Lilack
Lily
Locust tree
Love apple
Love in a mist
Love lies bleeding
Lupine

M

Maiden Hair
Mallows
Maple tree
Marygold
Meadow beauty
Melon mint
Monkey flower
Mother wort
Morning glory
Mouse ear
Mulberry
Mullein
Myrtle

N

Nettle
Nightshade
None-so-pretty

O

Oak tree
Oats
Onion
Orange

P

Painted cup
Parsnep
Passion flower
Pea
Peach
Pear
Pennyroyal
Peony
Peppergrass
Pickerel weed
Pigweed
Pignut
Pine tree
Pink
Plantain
Plum

Polypody
Poplar
Poppy
Potatoe
Prince's feather
Puff ball
Purslane

Q

Queen of the meadow
Quince tree

R

Radish
Raspberry
Rattlebox
Ribbon grass
Rose
Rye

Saffron
Sago
St. John's wort
Sarsaparilla
Sassafras
Saxifrage
Sedge grass
Shad flower
Shag-bark walnut
Shell flower
Shepherd's purse
Shin leaf
Sidesaddle flower
Skunk's cabbage
Snakeroot
Snowball
Snowdrop
Solomon's seal
Sorrel
Spearmint
Spicebush
Spider wort
Spruce tree
Star-grass
Star of Bethlehem
Steeple bush
Strawberry
Sunflower
Sweet-brier
Sweet-flag
Sweet-william

T

Tansy
Thistle
Thorn bush
Thyme
Touch-me-not
Trumpet flower
Tulip
Tulip tree
Turnip

V

Venus' fly-trap
Vervain
Violet
—— garden
—— blue
—— yellow
—— white
Virgin's bower

W

Wall flower
Walnut
Water-flag
Water-lily
Wheat
Whortleberry
Willow
Wintergreen
Witch-hazel
Wormwood

Y

Yarrow